

1. Find and classify all critical points of $f(x, y) = 25x^4 - 30x^2 + 4y^2 - 12y + 18$
2. Find and classify all critical points of $g(x, y) = -(x^2 - 1)^2 - (x^2y - x - 1)^2$
3. A rectangular, open-top box is to be constructed out of 60 square feet of cardboard.
Find the dimensions x , y , and z that will maximize the volume of the box.
4. Find the point on the surface $z = x^2 + y^2$ closest to the point $(3, 2, 6)$
5. Find and classify all critical points of $h(x, y) = 5 - 10xy - 4x^2 + 3y - y^4$